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Asthma in New Jersey

Conclusion

The purpose of this report is to provide statewide surveillance¹ data that will assist individuals and organizations in their efforts to reduce the burden of asthma in New Jersey. Uncontrolled asthma can result in activity limitations, missed school days, missed work days, hospitalizations, emergency department visits, and even death. These outcomes are generally considered avoidable; yet they place a tremendous burden on patients, their families, and the State in terms of reduced quality of life, lost productivity, occupational impairment, educational disruption, decreased income, and increased health care related expenditures. The Asthma and Allergy Foundation of America estimates the annual total cost of asthma in New Jersey was nearly \$324 million in 1998.² 2009 NJBRFS data show that approximately 295,000 New Jersey children (14.3%) and 840,000 adults (12.6%) have been diagnosed with asthma at some point in their lives and approximately 188,000 (9.1%) children and 511,000 adults (7.7%) have current asthma.

This Chapter will provide a summary of data sources and key findings from the previous chapters.

NJDOH Surveillance System

With funding from the Centers for Disease Control and Prevention (CDC), the New Jersey Department of Health (NJDOH) maintains a comprehensive surveillance system to monitor and report on asthma prevalence, emergency department visits, hospitalizations, deaths and various factors that are associated with the disease. NJDOH also implements a work-related asthma (WRA) surveillance project that has been funded by the National Institute for Occupational Safety and Health (NIOSH) since 1988. The data included here provides information about the burden of asthma, associated factors, and changes that occur over time. This information can be used to:

- Plan, implement, and evaluate interventions
- Target interventions and resources for populations most affected
- Inform legislation or public policies
- Impact school, work, or other institutionally based policies
- Inform clinical practice
- Revise the goals, objectives, or activities of programs or organizations
- Generate hypotheses or stimulate research activities
- Provide support for funding proposals
- Communicate information about asthma

Data Sources

New Jersey Behavioral Risk Factor Survey (NJBRFS): an ongoing population based telephone survey of non-institutionalized adult residents aged 18 years and older. If there are children under 17 in the household, the adult is interviewed about a randomly selected child. The NJBRFS represents a geographical subset of the national Behavioral Risk Factor Surveillance System (BRFSS), which was established in 1984 and is currently implemented across all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam where it is being used to monitor and improve the health of residents.

Asthma Call-back Survey (ACBS): developed by the CDC Air Pollution and Respiratory Health Branch as a comprehensive asthma-related extension of the BRFSS. Respondents who report a lifetime asthma history on the BRFSS are then called back in approximately two weeks to complete the ACBS, which was designed to collect detailed information about people living with asthma. If both the randomly selected child and the adult who answered the BRFSS questions have asthma, only one is selected for the ACBS. In 2008, New Jersey joined 35 other states in administering the ACBS among respondents reporting a lifetime asthma history on the BRFSS.

Work-related Asthma: The Occupational Health Surveillance (OHS) Unit within the NJDOH conducts surveillance for work-related asthma under an occupational health surveillance grant funded by the National Institute for Occupational Safety and Health (NIOSH). The components of the New Jersey work-related asthma surveillance and intervention project include case ascertainment and follow-up, worksite intervention, summary data analysis, and broad-based intervention activities. Cases of work-related asthma are identified primarily through health care providers' (physicians, physician assistants, and advanced practice nurses) reports, and hospital and emergency department discharge data.

Asthma ED visits: monitored using billing records that are collected and maintained by the NJDOH's Office of Health Care Quality Assessment. Since 2004, emergency department discharge data has been collected in New Jersey through Uniform Bill (UB) patient summaries submitted by all general acute care hospitals in the state. ED records are collected for billing rather than clinical purposes and the information presented does not represent visits occurring at non-acute, specialized, or out of state facilities. ED visits may include multiple events for the same person. Non-resident ED visits and ED visits that result in admission to the hospital are excluded from our analyses. An asthma ED visit is defined as a discharge from the ED with a primary diagnosis in the ICD-9 code range 493.0-493.9.

Asthma hospitalizations: monitored using hospital discharge records that are collected and maintained by the NJDOH's Office of Health Care Quality Assessment. Since 1981, hospital inpatient data has been collected in New Jersey through Uniform Bill (UB) patient summaries submitted by all general acute care hospitals in the state. Hospital discharge records are collected for billing rather than clinical purposes and the information presented does not represent hospitalizations occurring at non-acute, specialized, or out of state facilities. Hospitalizations may include multiple admissions for the same person and non-resident hospitalizations are excluded from our analyses. For our purposes, an asthma hospitalization is defined as an inpatient discharge with a primary diagnosis in the ICD-9 code range 493.0-493.9.

Asthma deaths and asthma-related deaths: monitored using the annual Multiple Cause-of-Death files maintained by the New Jersey Center for Health Statistics (NJCHS). Files are compiled from death certificates that have been registered for New Jersey residents. New Jersey law requires that a death

certificate be completed by the appropriate authority when a death occurs in the State and information about out of State deaths is acquired through participation in the national Vital Statistics Cooperative Program. Reporting is about 99% complete for deaths occurring in the United States. For our purposes, an asthma death is defined as one with an underlying cause in the ICD-10 code range J45-J46 (1999-present) or the ICD-9 code range 493.0-493.9 (1989-1998).

“Asthma in New Jersey” Publications

This version of “Asthma in New Jersey” includes the most recent statewide surveillance data on asthma. It is the fourth in a series of planned updates to the information and data that was first presented in “Asthma in New Jersey” (2003). “Asthma in New Jersey” will now be published as individual chapters that can be updated independently and used as stand-alone documents (Table 1).

Table 1		
Asthma in New Jersey		
Chapter	Status	Publication Date
Introduction	Completed	2010
Chapter 1: Lifetime Asthma and Current Asthma	Completed	2010
Chapter 2: Work-related Asthma	Completed	2012
Chapter 3: Children Living with Asthma	Completed	2012
Chapter 4: Adults Living with Asthma	Completed	2012
Chapter 5: Emergency Department Visits	Completed	2011
Chapter 6: Hospitalizations	Completed	2011
Chapter 7: Mortality	Completed	2011
Conclusion	Completed	2012

Chapter 1: Lifetime Asthma and Current Asthma

Lifetime asthma describes those who report ever having been told by a doctor, nurse, or other health professional that they have asthma. Current asthma describes those who reportedly still have asthma.

Children

According to data from the 2009 NJBRFS,³ approximately 295,000 New Jersey children have lifetime asthma (14.3%) and approximately 188,000 (9.1%) children have current asthma. Of children with lifetime asthma, about 65% have current asthma. Both lifetime asthma and current asthma are more common in male children than in female children (17.5% versus 10.4% for lifetime asthma; 11.7% versus 7% for current asthma). Asthma prevalence is about twice as high in black, non-Hispanic children as in white, non-Hispanic children (20.2% lifetime and 14.6% current for black, non-Hispanic versus 11.6% lifetime and 7.1% current for white, non-Hispanic) and about 1.5 times as high among Hispanic children compared with white, non-Hispanic children (17% lifetime and 10.6% current for Hispanic). Children in the lowest income households (less than \$20,000 annually) have both lifetime and current asthma prevalence at about 1.5 times that of children in the highest income households (more than \$75,000 annually).

Adults

According to data from the 2009 NJBRFS, approximately 840,000 adult residents of New Jersey have lifetime asthma (12.6%) and approximately 511,000 have current asthma (7.7%). The 2009 data also suggest that of those adults with lifetime asthma, about 63% have current asthma. There has been no significant change in the prevalence of lifetime or current asthma among adults from 2002 to 2009. Unlike among children, where prevalence is more frequent among males, adult women are more likely to have both lifetime (14.8% for women versus 10.6% for men) and current (10.4% for women vs. 5.9% for men) asthma compared to men. Adult lifetime and current asthma estimates also varied with age, with the highest frequency among the 18-24 group (19.2% lifetime; 12.1% current) and the lowest among those aged 65 and over (9.6% lifetime; 6.8% current). Lifetime and current asthma estimates are highest for adult residents who did not graduate high school (16.5%, 11.2%) and lowest for adult residents who graduated college or technical school (11.2%, 6.9%). Lifetime and current asthma are highest for adult residents with a household income of less than \$10,000 per year (22.3%, 16.7%) and are lowest for adults with a household income level of \$75,000 and more (11.7%, 7.0%). Obese adults are about 1.5 times as likely to have lifetime and current asthma as adults who are underweight, normal weight, or overweight.

Racial and ethnic differences are generally not as large among the adult population as in the child population. Black, non-Hispanic adults still show a higher prevalence of both lifetime and current asthma (about 25% greater) than white, non-Hispanic adults. Asian, non-Hispanic adults were about half as likely to have either lifetime or current asthma compared to white, non-Hispanic adults. The adult data allowed for more subgroup analysis than the child data, though two of the categories (Hispanic adults and other, non-Hispanic adults) are very diverse and national surveillance data suggest that the combination of groups in these categories may mask prevalence differences.⁴

Both lifetime and current asthma are associated with county of residence for adults in years 2005-2009. Estimates of current asthma ranged from 11.5% in Camden County to 5.4% in Somerset County. There appears to be some relationship with income levels, or with factors associated with income: of the seven counties with the highest median household incomes in 2006-2010, six of them had the lowest rates of current asthma.⁵

Chapter 2: Work-related Asthma

Work-related asthma (WRA) is a potentially debilitating lung disease with symptoms of chest tightness, cough, shortness of breath, and/or wheezing that develop following exposure to chemicals or other substances at work.⁶ Work-related asthma has become the most common work-related lung disease in the United States⁷ and can persist for years, even after cessation of workplace exposures. The primary intervention for WRA is prevention from exposure to the causative agent, either by removal or by effective engineering controls.

Work-related asthma includes work-aggravated asthma, which is pre-existing asthma that is exacerbated by occupational exposures. It also involves new-onset cases including two distinctive sub-types. Allergic, or immunologically mediated, asthma develops after a period of exposure to a sensitizing agent while reactive airways dysfunction syndrome (RADS), or irritant-induced asthma, is a non-immunologic type that is typically caused by a single exposure to high levels of an irritating vapor, gas, fume or smoke.

The number of agents that have been shown to cause work-related asthma is large and continually growing. More than 400 substances have been associated with WRA, affecting workers in a variety of

industries and occupations.⁸ Depending on how WRA is defined, the prevalence of WRA is estimated to range from five to 35 percent of adult asthma cases.⁹

Combined data from the New Jersey Asthma Call-back Survey (ACBS) from 2008 to 2010 suggest that:

- Around 6% (between 39,730 and 69,034) of adults in New Jersey with a lifetime asthma history have been diagnosed with work-related asthma by a health professional. Nearly 37% (between 258,092 and 338,160 adults with a lifetime asthma history) report some kind of work-related asthma, including asthma caused or aggravated by a current or previous job, or having discussed the possibility of work-related asthma with a health professional.
- Reports of work-related asthma varied with income and with education—ever-employed adults with current asthma and with higher levels of household income and education had less reported work-related asthma of any kind. The sample size was insufficient to look at factors associated with work-related asthma as diagnosed by a health professional.
- NJ adults with current WRA are about twice as likely to report very poorly controlled asthma and almost half as likely to report well-controlled asthma as are NJ adults with current asthma that is not work-related in any way.
- NJ adults with any type of current WRA reported one or more cost barriers to care for their asthma whereas only 11 percent of adults with current asthma not related to work in any way reported this. This is not surprising given the association that has been observed between income levels and work-related asthma.
- About 4% of NJ adults with a lifetime asthma history (between 22,046-48,687 individuals) report that they have changed or quit a job due to work-related asthma.

The Occupational Health Surveillance (OHS) Unit within the NJDOH conducts surveillance for work-related asthma under an occupational health surveillance grant funded by the National Institute for Occupational Safety and Health (NIOSH). The components of the New Jersey work-related asthma surveillance and intervention project include case ascertainment and follow-up, worksite intervention, summary data analysis, and broad-based intervention activities. Cases of work-related asthma are identified primarily through health care providers' (physicians, physician assistants, and advanced practice nurses) reports, and hospital and emergency department discharge data.

- NJ work-related surveillance and intervention project has identified only 471 cases of work-related asthma since 1993, indicating that work-related asthma may be greatly underreported.
- Approximately 70% of the number of confirmed WRA cases is new-onset.
- The largest percentage of WRA cases in NJ are found in the Health Services industry.
- About 25% of identified cases of work-related asthma occurred in the non-industrial work environments of health services and educational services.
- The largest percentage (18%) of WRA cases in NJ are found in Production Occupations.

- A higher percentage of Whites (62%) had confirmed cases of WRA than Blacks (21%) and Hispanics (11%).
- The top three agents most associated with identified cases of work-related asthma are non-specific chemicals, indoor air pollutants, and non-specific mold.

Early recognition of asthma and its connection to the workplace is crucial in directing intervention efforts to reduce and eliminate exposure to asthma-causing agents.

Chapter 3: Children Living with Asthma

For this analysis we combined data from the New Jersey Asthma Call-back Survey (ACBS) from 2008 to 2010 after verifying that the measure analyzed had not changed in prevalence over the period. In many cases, having few cases (about 150 per year) limited our ability to do subgroup analyses or report results where the estimated percentages were close to 100 or zero. Each measure was analyzed by sex, age group, race/ethnicity, household income and respondent education and significant results are noted. Children in the sample range in age from newborn to 17 years of age, and questions are asked of an adult respondent who answers for the child.

- Age of diagnosis. About 55 percent of children with current asthma were diagnosed before age four. Children with current asthma in households where the income was less than \$35,000 per year and those where the survey respondent had a high school education or less were more likely to be diagnosed before age four than those in households with higher income or a respondent with higher education.
- Symptomatic days. About 53 percent (95 percent confidence interval 46.1-60.6 percent) of children with current asthma did not experience any asthma symptoms in the thirty days prior to the survey. About 65 percent had fewer than three symptomatic days, about 17 percent had between three and seven symptomatic days, and about 18 percent had between 8 and 30 symptomatic days.
- Night symptoms. About 74 percent (95 percent confidence interval 66.8-80.2 percent) of children with current asthma had no trouble sleeping in the thirty days prior to the survey; about 26 percent (95 percent confidence interval 19.8-33.2 percent) had trouble sleeping on one or more days. About 19 percent of children with current asthma (95 percent confidence interval 12.9-24.4 percent) had trouble sleeping on six or fewer days.
- Asthma episodes or attacks. About 46 percent (95 percent confidence interval 38.2-53.0 percent) of children with current asthma had any asthma episode or attack in the 12 months preceding the survey. About 34 percent (95 percent confidence interval 27.4-41.4 percent) had one or more episodes in the three months before the survey.
- Insurance status. Almost ten percent of children with current asthma either had no insurance at the time of the survey, or had gaps in insurance during the year preceding the survey. About 90 percent had insurance for the entire twelve-month period prior to the survey. There was an indication of a relationship with household income, but the sample was too small to construct reliable point estimates.
- Type of insurance. About 26 percent of children with current asthma were insured by Medicare, Medicaid, or NJ Family Care (the Children's Health Insurance Plan in New Jersey), while about 74 percent were insured by a parent's employer or some other method. There were significant differences by race/ethnicity, household income and respondent education with this measure.

- Routine doctor visits. Nearly 28 percent of children with current asthma had no visits to a doctor or other health professional for a routine checkup for their asthma in the past year. About 43 percent had one or two visits, and nearly 30 percent had three or more visits.
- Urgent doctor visits. Nearly 36 percent of children with current asthma had one or more visits to a doctor or other health professional in the past year for urgent treatment of worsening asthma symptoms, or for an asthma episode or attack.
- Emergency department visits. About 16 percent of children with current asthma had one or more asthma-related visits to an emergency department or urgent care center in the twelve months prior to the survey. There were significant differences by age and household income. Data were collected about hospitalizations as well, but there were not enough instances to construct reliable estimates for children with current asthma.
- Missed school or child care. About 56 percent of children with current asthma missed one or more days of school or daycare in the prior year because of their asthma. There were significant differences by household income. Higher income households were more likely than others to report one to three missing days, as opposed to no days or four or more days.
- Activity limitation. Almost 57 percent of children with current asthma had some kind of activity limitation due to their asthma in the past year—nearly 17 percent reported that they limited their activities a moderate amount to a lot. There were significant differences by age. Children aged zero to four were the least likely to have reported activity limitations; those aged five to nine were the most likely to have reported limitations.
- Flu shot. About 59 percent (95 percent confidence interval 51.5 to 66.6 percent) of children with current asthma reportedly received a flu shot in 2008-2010.
- Asthma education. About 94 percent of respondents for children with current asthma reported some form of asthma education for the child or caregiver, and 59 percent reported three or more types of education. Of children with current asthma who attended school or child care, about 56 percent had an asthma action plan on file at the school or child care center.
 - Those with higher levels of education were more likely to report that children with current asthma or the caregiver had been taught to recognize the early signs and symptoms of an asthma episode.
 - Respondents for Hispanic children were less likely to report that the child or caregiver had received education about what to do during an asthma episode or attack than respondents for White, non-Hispanic children. Respondents with lower education levels were less likely to report that the child or caregiver had received education on what to do during an episode or attack than college or technical school graduates (though in the latter case there were so few cases reporting a lack of such education that reliable estimates were impossible to construct).
 - Respondents from households with lower incomes were less likely to report that the child or caregiver had been taught to use a peak flow meter than respondents from higher-income households.
 - Older children were more likely to have been given an asthma action plan, and to have received education about responding to asthma episodes and using peak flow meters. The relationship between household income and the respondent reporting an asthma action plan for the child was close to significance.
- Environmental exposures and actions to reduce exposure. The percent with reports of above average actions to reduce exposures to environmental triggers in the home is associated with race/ethnicity, household income and respondent education.

- Medications. Nearly 61 percent of children with current asthma had taken a prescription medication in the past three months, and about 50 percent of these reported taking medication within the past day.
 - Nearly 44 percent of children with current asthma were reported to have taken a long-term control medication in the past three months and nearly 54 percent had used a quick relief medication in that time. Thirty-six percent used both quick relief and long-term control medications in the past three months. Almost 40 percent of children with current asthma who had used long-term control medication in the past three months reportedly had proper use (on a daily schedule, not for episodes or attacks and not before exercise if the medication is not intended for this). About 59 percent of children with current asthma who had used quick relief medication in the past three months reportedly had proper use (for episodes or attacks and not on a daily schedule, and not before exercise if the medication is not intended for this). Nearly 44 percent were allowed to have their medications with them at school.
 - Respondents with higher levels of education reported a greater use of long-term control medications among children with current asthma.
 - Boys with current asthma had a greater likelihood of using both quick relief medications and long-term control and quick relief medications together.
 - Children from the highest income households and with respondents with a college or technical degree were more likely to have been reported to use over-the-counter medication at some point for their asthma than those from the lowest income households or those with respondents who had a high school education or less.
 - The percent of children with current asthma whose schools allow medications to be carried by students with asthma varied by age.
- Cost barriers. Respondents were asked if there was a time in the past 12 months when the child with current asthma needed primary care, specialist care, or medications for their asthma but were unable to access them because of the cost. There were too few reports of barriers to primary or specialist care to discuss these results. Nearly nine percent of children with current asthma were reportedly affected by one or most cost barriers in the past year. About seven percent of children with current asthma reportedly could not access asthma medications in the past year because of the cost.
- Birth weight. About 13 percent (95 percent confidence interval 7.7-18.0 percent) of children with current asthma had a reported low birth weight of less than 5.5 pounds. Having a low birth weight was associated with household income.
- Body mass index. Nearly half of children with current asthma were under- or normal-weight, and roughly one quarter each were either overweight or obese. The precision of the measurements is more doubtful than in many other cases because the heights and weights are based on the respondent's recollection and not done in a standardized way and also because it is not known when the measurements were done relative to the child's survey age. Thus, these estimates should be interpreted with caution. There were significant differences by age and household income—older children were less likely to be obese, as were those from households with higher incomes.
- Complementary/alternative care. Complementary or alternative care consists of a variety of practices and products not currently considered part of conventional medicine that are used together with conventional medicine (complementary) or in place of conventional medicine (alternative). Respondents can report on ten different methods including six that are self-care (herbs, vitamins, aromatherapy, homeopathy, yoga and breathing techniques) and four that are

practitioner-based (acupuncture, acupressure, reflexology and naturopathy). Most techniques were not common enough to develop reliable estimates. The only method that was stable over the reporting period and had reportable findings was breathing techniques, reported by nearly 13 percent of respondents in 2008-2010 (95 percent confidence interval 7.5-17.9 percent).

Chapter 4: Adults Living with Asthma

For this analysis we combined data from the New Jersey Asthma Call-back Survey (ACBS) or (where noted) the New Jersey Behavioral Risk Factor Surveillance System (BRFSS) Survey from 2008 to 2010 after verifying that the measure analyzed had not changed in prevalence over the period. Each measure was analyzed by sex, age group, race/ethnicity, household income and respondent education. Significant results are noted.

- Age of diagnosis. Among adults with current asthma, about 40 percent were diagnosed as a child (under age 18) and about 60 percent were diagnosed as an adult (18 and over). The estimates varied by gender with a larger proportion of males reporting diagnosis as a child and a larger proportion of females reporting diagnosis as an adult.
- Symptomatic days. Approximately 40 percent of adults with current asthma did not experience any asthma symptoms in the past month. In contrast, about 18 percent of adults with current asthma experienced asthma symptoms every day during the prior month. Adults with current asthma experienced asthma symptoms for about 8.6 days (7.4-9.8) on average in the past month. The percent of adults with current asthma who are symptomatic for 8 or more days each month varies by age and respondent education.
- Night symptoms. Approximately 73 percent of adults with current asthma reported no asthma-related sleeping difficulty in the past month; however, approximately five percent of adults with current asthma reported asthma-related sleeping difficulty every day during the prior month. Adults with current asthma experienced asthma-related sleeping difficulty on about 3.2 days (2.2-4.2) on average in the month prior to the survey. The percent of adults with current asthma who experience asthma related sleeping difficulty on three or more days each month varies by race/ethnicity, household income, and respondent education.
- Asthma episodes or attacks. Approximately 67 percent of adults with current asthma reported no asthma episodes or attacks in the past three months; however, approximately 14 percent of adults with current asthma reported at least three asthma episodes or attacks in the past three months. Adults with current asthma experienced about 1.9 (1.3-2.4) asthma episodes or attacks on average in the three months prior to the survey. The percent of adults with current asthma with two or more asthma episodes or attacks in the prior three months is associated with age and race/ethnicity.
- Insurance status. About 19 percent of adults with current asthma either had no health insurance at the time of the survey, or reported gaps in insurance during the past year. About 81 percent had insurance for the entire twelve-month period prior to the survey. There were significant differences by age, household income and respondent education.
- Routine doctor visits. Nearly 38 percent of adults with current asthma had no visits to a doctor or other health professional for a routine checkup for their asthma in the past year. About 38 percent had one or two visits, and about 24 percent had three or more visits. There were significant differences by age, race/ethnicity, household income and respondent education.
- Urgent doctor visits. Nearly 29 percent of adults with current asthma had one or more visits to a doctor or other health professional in the past year for urgent treatment of worsening asthma

symptoms, or for an asthma episode or attack. There were significant differences by age and race/ethnicity.

- Emergency department visits. Almost 12 percent of adults with current asthma had one or more asthma-related visits to an emergency department or urgent care center in the twelve months prior to the survey. There were significant differences by sex, age, race/ethnicity and respondent education.
- Hospital stays. Nearly five percent of adults with current asthma had one or more overnight hospital stays due to their asthma in the past year (overnight stays in the emergency department were not included).
- Missed work or activity days. About 31 percent of adults with current asthma missed one or more days of work or other usual activity in the prior year because of their asthma. There were significant differences by sex and age.
- Activity limitation. Almost 61 percent of adults with current asthma reported some kind of activity limitation due to their asthma in the past year—nearly 24 percent reported that they limited their activities a moderate amount to a lot. There were significant differences by age, race/ethnicity, household income and respondent education.
- Flu shot. In 2010, almost 44 percent of adults with current asthma reported getting a vaccination against influenza by an injection (95 percent confidence interval of 39.2 percent to 48.3 percent). The percentage of adults 65 and over who had gotten the vaccine was higher than those in other age groups.
- Asthma education. Respondents are asked about five aspects of self-management education. Nearly 90 percent of adults with current asthma had received some form of asthma education, and close to half had received three or more types of education. There were differences by age in the receipt of any asthma education (younger respondents age 18 to 34 were more likely to report receiving education).
 - There were differences by race/ethnicity and age in having been taught what to do during an asthma episode or attack. White, non-Hispanic and Black, non-Hispanic adults with current asthma had a similar rate of about 80 percent, while Hispanic adults with current asthma reported around 66 percent.
 - There were differences by sex and race/ethnicity with respect to asthma management plans. About 36 percent of women with current asthma reported being given a plan, as opposed to close to 25 percent of men. About 36 percent of Hispanic adults reported being given a plan, as compared with about 30 percent of Black, non-Hispanic adults, and 29 percent of white, non-Hispanic adults with current asthma.
 - The percent of adults with current asthma advised by a health professional to change items in their home, school or work environment to improve their asthma has declined over the 2008-2010 period from slightly more than 50 percent to about 34 percent
- Environmental exposures and actions to reduce exposure. Adults with higher household incomes and/or more education were more likely to take the actions asked about in the survey to prevent exposure to environmental triggers in the home.
- Medications. Among adults with current asthma, about 63 percent had taken a prescription medication in the past three months. Most of those taking medication within the past three months were taking it frequently—about 67 percent reported taking medication within the past day.
 - Forty-one percent of adults with current asthma reported taking a long-term control medication in the past three months and 49 percent reported using a quick relief medication in that time. Twenty-six percent reported using both quick relief and long-term control

- medications in the past three months. Fifty-two percent of adults with current asthma who had used long-term control medication in the past three months reported proper use (on a daily schedule, not for episodes or attacks and not before exercise if the medication is not intended for this). Sixty-one percent of adults with current asthma who had used quick relief medication in the past three months reported proper use (for episodes or attacks and not on a daily schedule, and not before exercise if the medication is not intended for this).
- There were significant differences among the percent of adults with current asthma using any prescription medication in the past three months by age and household income groups. Younger adults age 18-34 were less likely to have used a long-term control medication in the past three months than older age groups. Women were more likely than men to have used a quick relief medication in the past three months, and less likely than men to ever have used over-the-counter medicine for asthma. Finally, there were some differences by respondent education, race/ethnicity and household income in the percent of adults with current asthma who used inhaled quick relief medication properly in the past three months.
 - Cost barriers. Adult respondents with current asthma were asked if there was a time in the past 12 months when they needed primary care, specialist care, or medications for their asthma but were unable to access them because of the cost. Nearly 19 percent of adults with current asthma had at least one cost barrier to their asthma care, nearly 10 percent had two or more and slightly less than 5 percent had all three barriers. The most frequent barrier was in accessing medications, with about 13 percent of respondents reporting a cost barrier. Access to primary care was next, with about 11 percent reporting a cost barrier, followed by access to specialist care, where nearly 9 percent reported a cost barrier. There were differences by age, race/ethnicity, household income and respondent education in the reporting of barriers. Older respondents were less likely to report barriers (any barrier, medications) than middle-aged people. White, non-Hispanic respondents were less likely to report any barrier or barriers to medication than Black, non-Hispanic or Hispanic respondents. In general, respondents from higher income households and respondents with higher levels of education were less likely to report cost barriers.
 - Coexisting COPD or depression (ACBS). About one-third of adults with current asthma in 2008-2010 had COPD, which includes emphysema and chronic bronchitis. A little more than one-quarter had depression. Both conditions varied with levels of household income and respondent education—those with higher levels of income and education had a lower chance of having all of these conditions. Age and sex were significant factors for COPD. Older respondents were more likely to have COPD. Nearly 40 percent of adult women with current asthma reported having COPD, as opposed to about 22 percent of adult men with current asthma. Race/ethnicity was a significant factor for depression--Black, non-Hispanic adults with current asthma were less likely to report the condition.
 - Coexisting diabetes, cardiovascular disease and arthritis (BRFSS). Diabetes does not include gestational, borderline or pre-diabetes. Cardiovascular disease includes a history of heart attack, stroke, angina or coronary heart disease. The prevalence of each condition is higher among adults with current asthma than among those with former asthma and those who have never had asthma. All of the conditions are show increasing prevalence with age. Cardiovascular disease and arthritis are associated with sex—men are more at risk for cardiovascular disease and women are more at risk for arthritis. Diabetes and cardiovascular disease are associated with race/ethnicity, household income and respondent education. Black, non-Hispanic adults are at higher risk for these conditions than are white, non-Hispanic adults, and Hispanic adults fall between the two other groups. Adults with higher household incomes and higher educational levels are less at risk for these conditions.

- Body mass index (BRFSS). Adults with current asthma are more likely to be obese and less likely to be either under or normal weight or overweight than are adults who never had asthma. All of the demographic groups show a significant difference. With respect to obesity, adults 18 to 34 years of age are less likely to be obese than the older age groups. Black, non-Hispanic adults are more likely to be obese than white, non-Hispanic adults. Adults in households with income of \$75,000 per year or more are the least likely to be obese, as are respondents with the highest level of education.
- Smoking (BRFSS). Adults with current asthma are more likely to be current or former smokers and less likely to have never smoked than are adults who never had asthma. There are significant differences by age, race/ethnicity, household income and respondent education. Adults with current asthma in households with income of less than \$35,000 per year and those with a high school education or less were the most likely to be current smokers. Adults in households with income above \$75,000 per year, those with the highest levels of education, and young adults aged 18-34 were the most likely to never have smoked.
- Complementary/alternative care. Complementary or alternative care consists of a variety of practices and products not currently considered part of conventional medicine that are used together with conventional medicine (complementary) or in place of conventional medicine (alternative). About 42 percent of adults with current asthma reported using one or more methods of complementary or alternative care. The most commonly used method was breathing techniques, reported by 30 percent of adults with current asthma. Vitamins were a distant second, reported by 11 percent of respondents. Self-care methods (herbs, vitamins, aromatherapy, homeopathy, yoga and breathing techniques) were much more common than practitioner-based methods (acupuncture, acupressure, reflexology and naturopathy), with 38 percent of adults reporting any self-care method versus only six percent reporting any practitioner-based method. About 18 percent of adults with current asthma reported using two or more complementary or alternative methods, and only eight percent reported using three or more.

Chapter 5: Emergency Department Visits

Asthma-related ED visits are monitored using billing records that are collected and maintained by the NJDOH's Office of Health Care Quality Assessment. Since 2004, emergency department discharge data has been collected in New Jersey through Uniform Bill (UB) patient summaries submitted by all general acute care hospitals in the state. ED records are collected for billing rather than clinical purposes and the information presented does not represent visits occurring at non-acute, specialized, or out of state facilities. ED visits may include multiple events for the same person. Non-resident ED visits and ED visits that result in admission to the hospital are excluded from our analyses. An asthma ED visit is defined as a discharge from the ED with a primary diagnosis in the ICD-9 code range 493.0-493.9.

- The total number of asthma ED visits per year ranged from 49,237 to 52,753 during 2004-2009. In 2008, asthma ED visits represented about 2 percent of all resident ED visits in NJ.
- The annual age-adjusted asthma ED visit rate increased somewhat from 2004-2009.
- From 2004 to 2009, the asthma ED visit rate for children 5 to 9 years of age increased by about 19 percent and the rate for children 10 to 13 years of age increased by about 18 percent
- From 2004-2009, the asthma ED visit rate for black, non-Hispanic residents increased across all age groups.
- The highest asthma ED visit rate by age was for children under five years. The lowest asthma ED visit rate by age was for residents 65 years and older. Although preschool children experienced the

highest ED visit rate for asthma, the greatest number of asthma ED visits in 2009 occurred among residents 35-64 years.

- The relationship between asthma ED visits and gender varies by age group. Among children, a greater number of boys visited the ED for asthma when compared to girls in 2009. However, among adults more women visited the ED for asthma as compared to men in that same year. The asthma ED visit rate for boys under 5 years of age was about 1.7 times higher than that of girls under 5 years of age. This male-female rate difference became smaller with increasing age until about 14-17 years of age when the rate became higher for females. Females had both higher crude and age-adjusted asthma ED visit rates compared to males.
- In 2009, the asthma ED visit rate was highest for black, non-Hispanic residents and lowest for Asian/Pacific Islander, non-Hispanic residents across all age categories. The 2009 age-adjusted asthma ED visit rate for black, non-Hispanic residents was 1,722 per 100,000 standard population, followed by Hispanic residents (842 per 100,000 standard population), American Indian/Alaska Native, non-Hispanic residents (696 per 100,000 standard population), white, non-Hispanic residents (354 per 100,000 standard population), and Asian/Pacific Islander, non-Hispanic residents (109 per 100,000 standard population).
- In 2009, the frequency and rate of asthma ED visits among Hispanic residents varied by area of origin. Among Hispanic children, the highest asthma ED visit rate was for Other Hispanic (2,203 per 100,000 population) followed by Puerto Rican (1,174 per 100,000 population), Central or South American (916 per 100,000 population), Mexican (772 per 100,000 population), and then Cuban (396 per 100,000 population). Among Hispanic adults, the highest asthma ED visit rate was for Puerto Rican, (1,155 per 100,000 population), followed by Other Hispanic (1,068 per 100,000 population), Central or South American (335 per 100,000 population), Mexican (242 per 100,000 population), and then Cuban (225 per 100,000 population).
- Spanish was noted as the primary language spoken at home for about 8% of pediatric and about 7% of adult asthma ED visits in 2009.
- HMO was the most frequently noted primary payer for asthma ED visits in 2009 (17,508) followed by Self-Pay/Indigent Care (12,387) and Medicaid (8,940). Asthma ED visits represented about 2.5% of all resident Medicaid ED visits, 2.2% of all resident HMO ED visits, 2.0% of all resident self-pay/indigent care ED visits, 1.8% of all resident commercial ED visits, 1.7% of all resident Blue Cross ED visits, and 1.0% of all resident Medicare ED visits.
- In 2008 (2008 is used because some 2009 admissions were not resolved by the end of the year), the greatest number of asthma emergency department admissions overall occurred during the month of May (5,673) and the fewest number of asthma emergency department admissions occurred during the month of July (2,627). As a group, children experienced greater monthly fluctuations in the number of asthma ED visits when compared to adults. In 2008, both male and female children experienced an overall increase in asthma emergency department admissions during the fall and spring months. In contrast with asthma hospitalization trends, the ratio of asthma ED admissions relative to July did not appear to vary by gender among children. Seasonal trends in adult asthma ED admissions were less pronounced when compared to seasonal trends in childhood asthma ED admissions.

In 2009, the number of asthma ED visits and the asthma ED visit rate varied dramatically among the 21 counties of New Jersey. The 2009 age-adjusted asthma ED visit rate ranged from about 232 annual asthma ED visits per 100,000 standard population (Hunterdon County) to about 1,254 annual asthma ED visits per 100,000 standard population (Essex County). Considering all New Jersey resident asthma ED visits in 2009, about 18.3% (9,656) were for residents of Essex County while about 0.5% (260) were for

residents of Hunterdon County. By comparison, about 8.8% of New Jersey residents were living in Essex County while about 1.5% of New Jersey residents were living in Hunterdon County during the same year.

Chapter 6: Hospitalizations

With appropriate management, asthma can be controlled so that most hospitalizations are avoided. Asthma hospitalizations are monitored using hospital discharge records that are collected and maintained by the NJDOH's Office of Health Care Quality Assessment. Since 1981, hospital inpatient data has been collected in New Jersey through Uniform Bill (UB) patient summaries submitted by all general acute care hospitals in the state. Hospital discharge records are collected for billing rather than clinical purposes and the information presented does not represent hospitalizations occurring at non-acute, specialized, or out of state facilities. Hospitalizations may include multiple admissions for the same person and non-resident hospitalizations are excluded from this analysis. An asthma hospitalization is defined as an inpatient discharge with a primary diagnosis in the ICD-9 code range 493.0-493.9.

- The total number of asthma hospitalizations per year increased from 2001 (13,864) to 2009 (16,608). Asthma hospitalizations represented about 1.5 percent of all resident hospitalizations.
- The annual age-adjusted asthma hospitalization rate increased somewhat from 2001 to 2009.
- The highest asthma hospitalization rate by age was for children under five years. Rates for asthma hospitalization by age were at their lowest point for residents 14-17 years of age and then rose for each consecutive age grouping thereafter. The greatest number of asthma hospitalizations for any age group (about 40 percent) in 2009 were among residents 35-64 years.
- The asthma hospitalization rate for children under five decreased by about 20% from 2001 to 2009 while the asthma hospitalization rate for adults 65 years and older increased by about 85% from 2001 to 2009. The asthma hospitalization rate for all other age groups remained relatively constant during this time period.
- From 2001-2009, the asthma hospitalization rate for some groups increased while the asthma hospitalization rate for other groups decreased. The most notable changes:
 - The rate for black, non-Hispanic residents under five years of age decreased about 30%, from about 1,361 asthma hospitalizations per 100,000 population to about 956 asthma hospitalizations per 100,000 population.
 - The rate for Hispanic residents under 5 years of age decreased about 31%, from about 711 asthma hospitalizations per 100,000 population to about 492 asthma hospitalizations per 100,000 population.
 - The rate for black, non-Hispanic residents aged 65 years and older increased about 116%, from about 312 asthma hospitalizations per 100,000 population to about 674 asthma hospitalizations per 100,000 population.
 - The rate for white, non-Hispanic residents aged 65 years and older increased about 95%, from about 126 asthma hospitalizations per 100,000 population to about 245 asthma hospitalizations per 100,000 population.
- The relationship between asthma hospitalization and gender varies by age group. Among children, a greater number of boys were hospitalized for asthma compared to girls in 2009. However, among adults more women were hospitalized for asthma as compared to men. The asthma hospitalization rate for boys under five years of age was about 1.8 times higher than that of girls under five years of age. This male-female rate difference became smaller with increasing age until about 14-17 years of age when the rate became higher for females. Among residents 65 years of age and older, the rate for women was about 1.9 times higher than that of men. Females had a higher crude asthma hospitalization rate when compared to males (231 versus 149 asthma

hospitalizations per 100,000 population) and the age-adjusted asthma hospitalization rate for females was 1.4 times higher than that of males (217 versus 151 asthma hospitalizations per 100,000 standard population).

- In 2009, the asthma hospitalization rate was highest for black, non-Hispanic and lowest for Asian/Pacific Islander, non-Hispanic across all age categories. The 2009 age-adjusted asthma hospitalization rate for black, non-Hispanic residents was 449 per 100,000 standard population, followed by Hispanic residents (298 per 100,000 standard population), American Indian/Alaska Native, non-Hispanic residents (218 per 100,000 standard population), white, non-Hispanic residents (123 per 100,000 standard population), and Asian/Pacific Islander, non-Hispanic residents (61 per 100,000 standard population).
- In 2009, the frequency and rate of asthma hospitalizations among Hispanic residents varied by area of origin. Among Hispanic children, the highest asthma hospitalization rate was for Other Hispanic (543 per 100,000 population) followed by Puerto Rican (245 per 100,000 population), Central or South American (212 per 100,000 population), Mexican (155 per 100,000 population), and then Cuban (89 per 100,000 population). Among Hispanic adults, the highest asthma hospitalization rate was for Puerto Rican (369 per 100,000 population) followed by Other Hispanic (288 per 100,000 population), Cuban (163 per 100,000 population), Central or South American (100 per 100,000 population), and then Mexican (42 per 100,000 population).
- Spanish was noted as the primary language spoken at home for about 7% of both pediatric and adult asthma hospitalizations in 2009.
- Medicare was the most frequently noted primary payer for asthma hospitalizations in 2009 (about 29%) followed by HMO (about 28%), and Medicaid (about 14%). Asthma hospitalizations represented about 2.2% of all resident Medicaid hospitalizations, 2.0% of all resident self-pay/indigent care hospitalizations, 1.9% of all resident HMO hospitalizations, 1.3% of all resident Blue Cross hospitalizations, 1.3% of all resident commercial hospitalizations, and 1.2% of all Medicare hospitalizations.
- The average length of stay for asthma hospitalizations in 2009 was 3.8 days, but this varied by age and by gender. Average length of stay increased with increasing age and females had a longer average length of stay among all age categories. The average length of stay ranged from 2.1 days for female children under five years of age to 5.6 days for female adults 65 years of age and older. The average length of stay ranged from 2.0 days for male children under five years of age to 5.2 days for male adults 65 years of age and older.
- In 2008, the greatest number of asthma admissions overall occurred during the month of February (1,533) and the fewest number of asthma admissions occurred during the month of August (793). Children are more likely to experience monthly fluctuations in hospital admissions for asthma when compared to adults. As a group, they experience a dramatic increase in asthma hospital admissions during the fall and spring months with seasonal peaks most apparent in school age children. For example, the number of asthma hospitalizations that occurred for elementary school age children (5-9 years) in May was about 4.4 times the number that occurred in July. The same was true for the month of September.
- In 2008, both male and female children experienced an increase in asthma hospital admissions during the fall and spring months. For children, the number of admissions was highest during May and September while the number was lowest in July. The ratio of asthma hospital admissions relative to the reference month (July) was higher for male children when compared to female children suggesting that boys could be affected by seasonal factors differently when compared to girls. Seasonal trends in adult asthma hospital admissions were less pronounced and the role of gender in seasonal trends was less apparent when compared to seasonal trends in childhood asthma hospital admissions. For adults, the number of admissions was highest during the winter

months of January, February, and March while it was lowest during the summer months of July and August.

- In 2009, the number of asthma hospitalizations and the asthma hospitalization rate varied among the 21 counties of New Jersey. The 2009 age-adjusted asthma hospitalization rate ranged from about 68 annual asthma hospitalizations per 100,000 standard population (Hunterdon County) to about 323 annual asthma hospitalizations per 100,000 standard population (Essex County). Considering all New Jersey asthma hospitalizations in 2009, about 15.2% (2,521) were for residents of Essex County while about 0.6% (92) were for residents of Hunterdon County.

Chapter 7: Mortality

Asthma and asthma-related deaths are monitored using the annual Multiple Cause-of-Death files maintained by the New Jersey Center for Health Statistics (NJCHS). Files are compiled from death certificates that have been registered for New Jersey residents. New Jersey law requires that a death certificate be completed by the appropriate authority when a death occurs in the State and information about out of State deaths is acquired through participation in the national Vital Statistics Cooperative Program. Reporting is considered to be about 99% complete for deaths occurring in the United States. An asthma death is defined as one with an underlying cause in the ICD-10 code range J45-J46 (1999-present) or the ICD-9 code range 493.0-493.9 (1989-1998). An asthma-related death is defined as a non-asthma death with a contributing asthma cause in the ICD-10 code range J45-J46 (1999-present) or the ICD-9 code range 493.0-493.9 (1989-1998).

- Death from asthma is relatively uncommon. There were 104 to 113 asthma deaths per year during 2003-2006 and the average annual asthma death rate during this time period was about 12.5 deaths per million residents. Rates could not be calculated for children due to a small number of asthma deaths. Rates increased with age and the highest rate was found among residents aged 85 years and older (114.3 asthma deaths per million residents).
- The asthma death count among New Jersey residents appears to vary by age group and month of death. Given the relatively small number of asthma deaths, monthly figures should be interpreted with caution. Nonetheless, mortality patterns seem to support the existence of age-specific seasonal patterns, which is consistent with observations on the national level.
- Heart disease and chronic lower respiratory diseases excluding asthma were the most common contributing causes of Asthma deaths in New Jersey from 2003-2006.
- During 2000-2006, the annual age-adjusted asthma death rate was generally higher among women than men. About 64% of the asthma deaths that occurred from 2000-2006 were among women.
- During 2000-2006, the annual age-adjusted asthma death rate was considerably (from about 3 to 5.7 times) higher among black, non-Hispanic residents as compared to white, non-Hispanic residents each year.
- The 2004-2006 average annual age-adjusted asthma death rate for Hispanic residents was 12.4 deaths per million population (95% CI: 8.0-16.8), compared to 31.3 deaths per million population (95% CI: 25.2-37.4) for black, non-Hispanic residents and 8.5 deaths per million population (95% CI: 7.2-9.7) for white, non-Hispanic residents during the same time period. Data for Hispanic people should be interpreted with caution since national data suggests asthma age-adjusted death rates depend on the area of origin.
- The number of asthma-related deaths during 2003-2006 ranged from 135 to 154 per year with a total of 575 asthma-related deaths among residents during the four years, which is about 33% higher than the number of asthma deaths (431) during the same time period. Although the highest number of asthma related deaths (23%) was among the oldest age group of residents (85+ years),

about 40% of asthma related deaths during 2003-2006 occurred among residents younger than 65 years of age (236 deaths).

- Heart disease and cancer were the most common underlying cause of asthma-related deaths in New Jersey from 2003-2006.

Acronyms:

ACBS – Asthma Call-back Survey

BMI – Body Mass Index

BRFSS – Behavioral Risk Factor Surveillance System

CI – Confidence Interval

ED – Emergency Department

ICD – International Classification of Diseases

NIOSH – National Institute for Occupational Safety and Health

NJDOH – New Jersey Department of Health

OHS – Occupational Health Surveillance

RADS – Reactive Airways Dysfunction Syndrome

Work-related Asthma – Work-related Asthma

Definitions:

Age-Adjusted Death Rate – A hypothetical death rate that facilitates comparison among populations that differ in underlying age structure. The age-adjusted death rates presented here were calculated with the direct method of age adjustment using the 2000 U.S. standard population.

Age-Adjusted Rate – A hypothetical rate that facilitates comparison among populations that differ in underlying age structure. The age-adjusted rates presented here were calculated with the direct method of adjustment using the 2000 U.S. standard population.

Confidence Interval – A range of values within which the actual value is likely to fall

Contributing Causes of Death – “Other significant conditions contributing to the death, but not related to the disease or conditions causing it.”¹⁰

Crude Death Rate – The number of deaths divided by the number of people at risk for the time period noted. Those presented here are multiplied by a million for expression as a whole number.

Current Asthma – Proportion of the population who reports having asthma at the time of the survey (on the NJBRFS, a “Yes” response to "Do you still have asthma?")

Former Asthma – Proportion of the population who reports not having asthma at the time of the survey (on the NJBRFS, a “No” response to "Do you still have asthma?")

ICD – “A coding system maintained by the World Health Organization and the U.S. National Center for Health Statistics used to classify causes of death on death certificates and diagnoses, injury causes, and medical procedures for hospital and ED visit visits. These codes are updated every decade or so to account for advances in medical technology.”¹¹

Lifetime Asthma – Proportion of the population who have ever had an asthma diagnosis (on the NJBRFS, a “Yes” response to “Have you ever been told by a doctor or other health professional that you have asthma?”)

Public Health Surveillance – “Ongoing, systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control.”¹

Underlying Cause of Death – “The disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury.”¹⁰

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For more information about the NJ Asthma Awareness and Education Program:

www.nj.gov/health/asthma

For asthma resources from the Pediatric Adult Asthma Coalition of New Jersey (PACNJ):

www.pacnj.org

For more information about the NJ Work-related Asthma Program:

<http://www.nj.gov/health/eoh/survweb/wra/index.shtml>

For more information about New Jersey ED and Hospital Discharge Data:

<http://www.state.nj.us/health/healthcarequality/ub/ub92intro.shtml>

For more information about New Jersey Mortality Data:

<http://www4.state.nj.us/dhss-shad/query/DeathQueryTechNotes.html>

For more information about the NJBRFS:

www.nj.gov/health/asthma

For more information about the BRFSS:

www.cdc.gov/brfss

For more information about the Asthma Call-back Survey:

<http://www.cdc.gov/brfss/acbs/index.htm>

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